

# The Application of Single-Source Publishing to E-Government



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## INTRODUCTION

The following article provides an introductory overview of Extensible Markup Language (XML) and how it may be applied to certain processes of e-government to improve accessibility to government services as well as to make governments' services more widely available. In particular, this discussion explores how the kind of single-source framework used in digital publishing can be used to drive the storage, delivery, and exchange of e-government information and services. The first section of this article provides a basic introduction to XML. The second part illustrates how content is prepared and disseminated using XML, providing some existing and hypothetical examples of this single-source approach. The final section looks at future trends as well as some of the challenges that may be encountered when using this XML-based single-source framework.

## BACKGROUND

A central technical dimension of e-government continues to be the dissemination of information to citizens, as well as between government agencies, stakeholders, and other groups. The most visible and largest growing area of e-government in recent years is the use of the Internet and World Wide Web to deliver government information and services. Between 1996 and 2001 alone, the number of official government homepages throughout the world grew from less than 50 to over 50,000 (Ronaghan, 2002, p. 5). As Abramson and Morin point out, it is now expected that public, private, and not-for-profit organisations will have a Web site: "the key question today is not whether organisations, including those in the public sector, have Web sites, but what is the quality of those sites and the scope of services being provided online" (Abramson & Morin, 2003, p. 4).

From a user's perspective, this technology makes it easier for people to gather documents about government and politics, become involved in political discussion

groups and collaborate to organise certain political activities (Davis & Owen, 1998). From a content provider's perspective, the scope and scale of e-government activities, ranging from any official government online presence to the full integration of e-services across administrative boundaries (Ronaghan, 2002), necessitates the need for effective and efficient ways of disseminating content to this range of users across a variety of contexts.

With the diffusion of information and communications technology, such as the Internet, e-government faces three closely related imperatives:

1. The need to disseminate information to different outputs (e.g., Web, print);
2. The need for citizens and other stakeholders to access this information from a variety of contexts (e.g., work, home, public kiosk); and
3. The need to be able to share this information with different individuals and groups (e.g., government agencies, NGOs, multi-stakeholders) in an efficient and effective way.

XML has been developed from the experiences of commercial and government organisations seeking to store, display, and disseminate large volumes of information. It is a metalanguage used to mark up content<sup>1</sup> for delivery across multiple platforms and to different kinds of users. XML is used to describe how different kinds of data are stored, exchanged, and presented. XML has been particularly successful in digital publishing and certain areas of e-learning.<sup>2</sup> In its application to digital publishing, XML "provides a well-defined, broadly accepted syntax for creating markup schemes to [enable] the development of tag sets focused on projects as small as a single book or journal ... or whole collections or classes of books or journals ... or to achieve a particular functionality" (Kasdorf, 2003, p. 87).

The use of XML within a single-source publishing approach to the production, storage, and exchange of information is by no means new and has a wide range of applications to e-government. A single-source approach

involves a process in which a master source of information is prepared using XML to make that information available to end-users through print, the Web, and a variety of other platforms as necessary. The major advantage of this single-source approach is to make content reusable and accessible via a range of media.

The following discussion seeks to provide an introduction to XML and outlines how it can be used to encode a single source of content in such a way that it can be used in different ways and formats for online, printed, and other delivery platforms according to the needs of end-users.

## **XML: An Overview**

XML is a text-based metalanguage that is “extensible,” or customisable, enabling users to construct their own specialised markup languages to transmit data (Bray et al., 2004; Bradbury, 2001). XML serves a rule-based system “designed for marking up content of all sorts (text, graphics, computer code, commercial information, intellectual information) in order to specify what the component parts of that content are, and to describe them” (Kasdorf, 2003, p. 91). XML users can create their own tags to act as hidden labels to annotate the content, be it for a Web page or sections of a text within a page (Berners-Lee, Hendler, & Lassila, 2001).

Development of XML began in 1996 under the auspices of the main standards body for the Internet, the World Wide Web Consortium (W3C), as a subset of Standard Generalised Markup Language (SGML) that would be easier to implement on the Web (Bray et al., 2004; Bosak & Bray, 1999). XML originated in the commercial and governmental use of SGML and Hypertext Mark-up Language (HTML). XML’s designers drew from: (1) the positive aspects of SGML; while (2) seeking to address some of the limitations of HTML as a mark-up language (Kasdorf, 2003).

XML is a restricted form of SGML (Bray et al., 2004). SGML (Goldfarb, 1990) has been widely used in manufacturing, medicine and aerospace industries, as well as public administration, such as the US Department of Defence and Internal Revenue, to enable contractors and suppliers to exchange large technical documents, and for other large publishing applications (Bosak & Bray, 1999; Kasdorf, 2003, Salminen, 2005). As a subset of SGML, XML provides a standard basis for industries, organisations, and individuals to exchange information, using their own vocabularies and structures, as well as a data interchange between software applications.

Rather than replace HTML, which is primarily a presentational format designed for a specific way of viewing content on the Web, XML is “in its best use, a *source* markup, designed to be transformed into something else,

to be archived and used in different ways...XML retains the information about what the elements in the source content *are* and how they *relate*; HTML typically loses that information, focussing instead on what the content should *look like* in a given presentation” (Kasdorf, 2003, p. 91).

Like HTML, XML makes use of tags (words bracketed by “<“ and “>”) and attributes. Unlike HTML, which has a fixed set of tags, XML has a potentially infinite number of tags. It enables users to define and use their own tags but “has no built-in mechanisms to convey the meaning of the user’s (i.e., content providers) new tags to other users” (Berners-Lee, Hendler, & Lassila, 2001, p. 32). Users of XML can assign explicit meaning to data stored in an XML file, using tags to delimit portions of data without having to specify how that data will be interpreted by the application processing it. HTML, on the other hand, specifies the meaning of tags and attributes, and how a browser will display the text between tags.<sup>3</sup> For example, using a “<p>” tag in XML does not necessarily have to define a paragraph, as it does in HTML, but can signify any attribute created by content providers to suit their specific needs and in a language that they understand.

## **How XML Works: A Sample Workflow**

It is not uncommon for government information to be made available online in a Portable Document Format (PDF), Microsoft Word (DOC) or Rich Text Format (RTF) in the form of a single file suited to printing in hardcopy. Often, the file displayed online is text-based, static, and identical to the printed version, because the content is taken directly from printed source files stored in PDF, RTF, and/or Word. Alternatively, data is stored in multiple sources and formats (e.g., PDF, HTML, RTF, and MS Word) leading to inefficiencies in data management and unnecessary duplication of labour.

Generating single-source content using XML involves a multi-stage process that may take place in a number of ways. For example, the initial document may be created directly in XML or repurposed from RTF or Word and then exported into a source XML file. This source file may then be transformed into other XML vocabularies for print, the Web, or other outputs. A single-source approach requires that content be ‘captured’ early on at the authoring and formatting stage so that content can be marked up for multiple outputs in a unified process.

This source XML file may be structured and tagged according to a Document Type Definition (DTD) suited to the type of content intended for storage and dissemination (Bray et al., 2004). A DTD is a kind of template for the XML file. It is a separate file that defines what goes where

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